

“39”, but that refers to the body of Asano’s package 39 formed of a “sealing resin” (Col. 5, line 32). Neither “37” nor “39” can correspond to the “members” of claim 1. Nor can connecting portion 44, which is removed prior to encapsulation. Col. 6, line 14. Hence, the rejection must be withdrawn.

Regarding claims 6 and 7, the rejection also should be withdrawn because each of the claims recites a further feature relating to the “members” of claim 1 absent from Asano.

Regarding claim 11, the rejection also is traversed. Claim 11 includes that “the encapsulant material is between said plate and the first portion of the leads.” This feature is exemplified by Fig. 10A of the present disclosure. This feature is not present in Asano, because Asano’s inner leads 33 are coupled to heat spreader 35 by an adhesive 35a. Col. 6, lines 40-42. Hence, claim 11 is not anticipated.

2. Rejection of claims 30-33 under 35 USC 102

Regarding claim 30, the argument made above with respect to the “members” of claim 1 also applies to claim 30. Further, the “members” of claim 30 must be “in a metal to metal connection with a surface of the plate.” This feature also is absent from Asano.

Regarding claim 32, the argument made above with respect to claim 11 also applies to claim 32. Hence, the rejection must be withdrawn.

Claim 33 recites a further aspect of the “metal to metal connection” of claim 30 absent from Asano. Hence, the rejection must be withdrawn.

3. Rejection of claims 21 and 34 under 35 USC 103

Claims 21 and 34 were rejected under 35 USC 103 as obvious over Asano in view of U.S. Patent 6,117,709 to Hirose. These rejections are traversed for the same reasons stated above for claims 1 and 30.

4. Rejection of claims 22 and 23 under 35 USC 103

Claims 22 and 23 were rejected under 35 USC 103 as obvious over Asano in view of Hirose and further in view of U.S. Patent 6,306,687 to Corsis et al. (“Corsis”). These claims are traversed for the same reasons set forth above for claim 1.

Further, it is respectfully submitted that Corsis does not supply the particular features of claims 22 and 23. The Examiner did not point to particular structures shown in Corsis’ figures. The Examiner cites to Col. 3, lines 43-60, but that text refers to a slot in a piece of

tape, which seems to have no relation to claims 22 and 23. The Examiner also cites to Col. 5, lines 39-48, but that discussion applies to slots 32 and 34 in tape 16 of Corsis' Figure 1, which also seems to have no relation to claims 22 and 23. Accordingly, the rejections also should be withdrawn.

5. Rejection of claim 24 under 35 USC 103

Claim 24 was rejected as obvious over Asano in view of U.S. Patent 5,327,008 to Djennas et al. ("Djennas"). The rejection is traversed, on grounds that Asano does not disclose the "members" of claim 1. Further, Djennas' tie bars 16 cannot be the "members" of the claim, because Djennas' tie bars 16 do not have an inner end, but rather extend contiguously from one corner of the leadframe to the other. Hence, since Djennas does not provide the features missing from Asano, the rejection must be withdrawn.

6. Rejection of claims 35 and 36 under 35 USC 103

Claims 35 and 36 were rejected as obvious over Asano, Djennas, and Corsis. The rejection are respectfully traversed.

Regarding claim 35, none of Asano, Djennas, and Corsis teaches claim 35's feature of "three metal pseudo tie bars each extending diagonally from a first end located at a second corner, a third corner, and a fourth corner, respectively, of the perimeter of package body to a second end overhanging the periphery of the plate and each being in a connection with the plate." Asano and Corsis have no structures even remotely similar to these features. Djennas shows tie bars 16, but not "pseudo tie bars" having "a second end overhanging the periphery of the plate," as recited in claim 35. Hence, the rejection of claim 35 must be withdrawn.

Claim 36 recites further features concerning the "pseudo tie bars" of claim 35 that are absent from the Examiner's combination. Hence, this claim also is allowable.

7. Rejection of claim 12 under 35 USC 102

Claim 12 was rejected under 35 USC 102(b) as anticipated by U.S. Patent 5,140,404 to Fogal et al. ("Fogal"). This rejection is traversed, because Fogal fails to disclose claim 12's feature of "a flat metal plate supported in the central region, wherein a first portion of each said lead overhangs a periphery of said plate." In Figure 3, Fogal discloses a tape 24 made of "a plastic or polyimide carrier material." Col. 5, line 8. In Figures 4 and 5, Fogal discloses

similar tapes 44 and 42, respectively, neither of which is "metal." Hence, claim 12 is not anticipated by Fogal, and the rejection must be withdrawn.

8. Rejection of claims 13-20 and 29 under 35 USC 103

Claims 13-20 and 29 were rejected under 35 USC 103 over Fogal in view of Asano. These rejections are traversed for at least the reasons set forth above for claim 12. The rejections must be withdrawn.

Regarding claims 16 and 17, the rejections also are traversed for reasons similar to those forth above for claims 1 and 6, since Asano does not disclose "members" having the recited features. The rejections must be withdrawn.

In claims 19 and 29, the further recitation of a "metal to metal connection" also cannot be present in view of Asano's lack of "members." The rejections must be withdrawn.

9. Rejection of claims 25-28 under 35 USC 103

Claims 25-28 were rejected under 35 USC 103 as obvious in view of Fogal, Djennas, and Corsis. These rejections also are respectfully traversed for at least the same reasons set forth above for claim 12.

Regarding claims 25 and 26, the rejections also are traversed because Corsis lacks the particular features of these claims, as discussed above for claims 22 and 23.

Regarding claims 27 and 28, the rejections also are traversed because Djennas lacks "three pseudo tie bars" each including a "second end overhanging the periphery of the plate." Djennas has contiguous tie bars 16 that lack an inner end. Claim 28 recites a further feature of the "pseudo tie bars," and thus also is allowable.

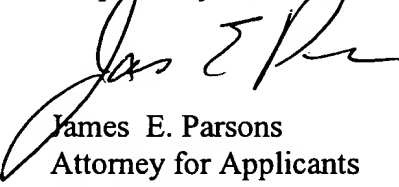
CONCLUSION

Claims 37-43 are allowed. The remaining claims are submitted to be allowable. Please direct questions or comments to the undersigned at 408 487-1315.

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Appendix of Pending Claims

1. A semiconductor package comprising:
 - a semiconductor chip;
 - a package body formed of a hardened encapsulant material;
 - a plurality of metal leads, wherein each lead is electrically connected to the chip;
 - a flat metal plate fully encapsulated within said package body, wherein the chip is mounted on the plate and an encapsulated first portion of each of the leads overhangs a periphery of the plate; and
 - a plurality of electrically isolated, encapsulated members, wherein each said member extends from a perimeter of the package body toward the plate and overhangs the periphery of the plate and is in a connection with the plate.
2. The package of claim 1, wherein the plate is comprised of copper and has a CuO or Cu₂O film on all surfaces thereof.
3. The package of claim 1, wherein an electrically insulative, thermally conductive adhesive layer is attached between the first portion of the leads and the plate, and said layer is covered by said encapsulant material.
6. The package of claim 1, wherein each said member extends from a corner of the perimeter of said package body.
7. The package of claim 1, wherein the metal plate is connected to said members by an electrically insulative, thermally conductive adhesive layer.

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10. The package of claim 1, wherein the metal plate has a thickness that is at least two times a thickness of said leads.

11. The package of claim 1, wherein the encapsulant material is between said plate and the first portion of the leads.

12. A leadframe comprising:

a metal frame including a central region within the frame;

a plurality of metal leads extending from a first end integral with the frame to a second end adjacent to the central region, wherein at least a plurality of the leads increase in width as those leads extend from the frame toward the central region; and

a flat metal plate supported in the central region, wherein a first portion of each said lead overhangs a periphery of said plate.

13. The leadframe of claim 12, wherein the plate is comprised of copper and has a CuO or Cu₂O film on all surfaces thereof.

14. The leadframe of claim 13, wherein an electrically insulative, thermally conductive adhesive layer is attached between the first portion of the leads and the plate.

16. The leadframe of claim 12, further comprising a plurality of members extending from said frame adjacent to said leads, wherein each said member overhangs the periphery of the plate and is in a connection with said plate.

17. The leadframe of claim 16, wherein each said member extends from a corner of said frame.

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18. The leadframe of claim 16, wherein the metal plate is connected to said members by an electrically insulative, thermally conductive adhesive layer.

19. The leadframe of claim 16, wherein each connection is a metal to metal connection between the plate and the respective member.

20. The leadframe of claim 16, wherein the metal plate has a thickness that is at least two times a thickness of said leads.

21. The package of claim 1, wherein at least a plurality of the leads increase in width as those leads extend from the perimeter of the package body toward the plate.

22. The package of claim 21, wherein two leads of increasing width are adjacent and extend from opposite sides of a first corner of the perimeter of the package body, said two leads defining a first slot between them, said first slot extending from the first ends of the two leads to their respective second ends and filled with the encapsulant material.

23. The package of claim 22, further comprising a short tapered metal first member located at the first corner of the perimeter of the package body and extending into the first slot for only a portion of a length of the first slot.

24. The package of claim 1, wherein three of said plurality of encapsulated members each extend diagonally from a first end located at a second corner, a third corner, and a fourth corner, respectively, of the perimeter of the package body to a second end overhanging the periphery of the plate.

25. The leadframe of claim 12, wherein two leads of increasing width are adjacent and extend from opposite sides of a first corner of the frame, said two leads defining an open

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first slot between them, said first slot extending from the first ends of the two leads to their respective second ends.

26. The leadframe of claim 25, further comprising a short tapered metal first member integral with the first corner of the frame and extending into the first slot for only a portion of a length of the first slot.

27. The leadframe of claim 12, further comprising three metal pseudo tie bars each extending diagonally from a first end integral with a second corner, a third corner, and a fourth corner, respectively, of the frame to a second end overhanging the periphery of the plate.

28. The leadframe of claim 27, wherein each pseudo tie bar includes a first portion at the second end overhanging the periphery of the plate, a second portion adjacent to the first end integral with the respective corner of the frame, and a third portion between the second portion and the first portion, wherein the second portion is wider than the third portion and has edges that taper into the third portion.

29. The leadframe of claim 19, wherein each said metal to metal connection is between the respective member and a protrusion from a surface of the plate, and the protrusion is stamped or swaged against the respective member to form the metal to metal connection.

30. A semiconductor package comprising:

a semiconductor chip;

a package body formed of a hardened encapsulant material;

a plurality of metal leads, wherein each lead is electrically connected to the chip;

a flat metal plate fully encapsulated within said package body, wherein the chip is mounted on the plate, and an encapsulated first portion of each of the leads

overhangs the periphery of the plate, and the plate has a thickness that is at least two times a thickness of the leads; and

a plurality of encapsulated members, wherein each said member extends from a perimeter of the package body toward the plate, and overhangs a periphery of the plate, and is in a metal to metal connection with a surface of the plate.

31. The package of claim 30, wherein an electrically insulative, thermally conductive adhesive layer is attached between the first portion of the leads and the plate, and the adhesive layer is covered by the encapsulant material.

32. The package of claim 30, wherein the encapsulant material is between said plate and the first portion of the leads.

33. The package of claim 30, wherein a protrusion of the flat metal plate is stamped or swaged against the respective member, thereby forming the metal to metal connection.

34. The package of claim 30, wherein at least a plurality of the leads increase in width as those leads extend from the perimeter of the package body toward the plate.

35. A semiconductor package comprising:

a semiconductor chip;

a package body formed of a hardened encapsulant material;

a plurality of metal leads each electrically connected to the chip, wherein at least a plurality of the leads increase in width as those leads extend from a perimeter of the package body, and wherein two leads of increasing width are adjacent and extend from opposite sides of a first corner of the perimeter of the package body, said

two leads defining a first slot between them, said first slot extending from the first ends of the two leads to their respective second ends;

a flat metal plate fully encapsulated within said package body, wherein the chip is mounted on the plate, and an encapsulated first portion of each of the leads overhangs a periphery of the plate, and the plate has a thickness that is at least two times a thickness of the leads;

a metal first member located at a first corner of the package body and extending into the first slot for only a portion of a length of the first slot, the first member being encapsulated by the package body and including intersecting straight edges that taper to a point aligned with a central axis of the first slot; and

three metal pseudo tie bars each extending diagonally from a first end located at a second corner, a third corner, and a fourth corner, respectively, of the perimeter of package body to a second end overhanging the periphery of the plate and each being in a connection with the plate.

36. The package of claim 35, wherein each pseudo tie bar includes a first portion at the second end overhanging the periphery of the plate, a second portion adjacent to the first end located at the respective corner of the perimeter of the package body, and a third portion between the second portion and the first portion, wherein the second portion is wider than the third portion and has edges that taper into the third portion.

37. (Amended) A leadframe comprising:

a metal frame including four corners and a central region within the frame;

three metal pseudo tie bars each extending diagonally from a first end integral with a second corner, a third corner, and a fourth corner, respectively, of the frame to a second end adjacent to the central region;

a plurality of metal leads each extending from a first end integral with the frame to a second end adjacent to the central region, wherein at least a plurality of the leads increase in width as those leads extend from the frame toward the central region, and wherein two leads of increasing width are adjacent and extend from opposite sides

of a first corner of the frame, said two leads defining an open first slot between them, said first slot extending from the first ends of the two leads to their respective second ends; and

a flat metal plate supported in the central region, wherein the plate has a thickness that is at least two times a thickness of said leads, and wherein a first portion of each said lead overhangs a periphery of the plate, and wherein a first portion of each said pseudo tie bars overhangs the periphery of the plate and is in a connection with the plate.

38. The leadframe of claim 37, wherein an electrically insulative, thermally conductive adhesive layer is attached between the first portion of the leads and the plate.

39. The leadframe of claim 37, wherein each of the connections between the plate and the first portions of the tie bars comprises an electrically insulative, thermally conductive adhesive layer.

40. The leadframe of claim 37, wherein each of the connections between the plate and the first portions of the tie bars comprises a metal to metal connection.

41. The leadframe of claim 37, wherein said first slot is between two pair of adjacent leads of increasing width, wherein each said pair includes one of the two leads defining the first slot, and wherein the two adjacent leads of each said pair define an open second slot between them, and each of the second slots has a width, and the width of the second slots each are less than the width of the first slot.

42. The leadframe of claim 37, wherein the first slot increases in width and then decreases in width from the frame toward the central region.

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43. The leadframe of claim 37, further comprising a short tapered metal first member integral with the first corner of the frame and extending into the first slot for only a portion of a length of the first slot.

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